

The term "graft copolymer" does not read on a polymer blend. The term "polymer blend" does not read on a graft copolymer (Thomas Declaration, ¶¶ 4-5).

A graft copolymer requires that two polymers A and B be chemically reacted to form part of the same molecule, such that molecular chain or block of polymer A is chemically attached to a backbone of polymer B, or vice versa. If both polymer components were laid out flat, a single molecule of graft copolymer would resemble a "T", with one of the polymer components forming the base of the "T" and the other forming the cap of the "T." A graft copolymer cannot exist unless both polymer components are present in the same molecule (Thomas Declaration, ¶ 4).

A polymer blend, by contrast, exists where polymer components A and B are present as separate molecules. The term "blend" reads on molecules of polymer component A mixed with molecules of polymer component B, but does not read on a single molecule containing both A and B.

When two polymer components A and B are chemically inert, and are mixed together, in a molten state, they remain as separate molecules of A and B and do not chemically react to form graft copolymers. Instead, graft copolymerization requires a specific reaction mechanism. One such mechanism involves the use of a catalyst which causes the otherwise inert molecules of A and B to react and form a single graft copolymer molecule. Another mechanism involves processing the polymers A and B under extreme conditions of heat and/or shear to cause chain scission (i.e., degradation) of A and/or B. This chain scission results in the formation of free radicals, thereby enabling segments of A and B to react to form a single molecule (Thomas Declaration, ¶¶ 5-8).

Typical extrusion processes are aimed at preventing degradation of the polymers being extruded. Thus, while polymers are typically extruded in a molten state, it is known to avoid extreme conditions which cause chain scission or other degradation of the polymer molecules. Thus, absent any indication to the contrary, a reference that discloses blending polymers together and extruding them does not disclose or suggest forming graft copolymers from the blend components (Thomas Declaration, ¶ 11).

a) Claim Rejection Based on Walton

The rejection of Claims 1 and 4-35 under 35 U.S.C. § 102(b) as anticipated by, or under 35 U.S.C. § 103(c) as obvious over U.S. Patent 6,479,154 ("Walton") is respectfully

traversed. Walton discloses a core layer of a film which contains greater than about 75% by weight of a lower performance polyolefin elastomer and, optionally, small amounts of a higher performance styrene block copolymer elastomer (Col. 4, lines 29-37, Col. 10, lines 52-67). The film is prepared using conventional extrusion processes (Col. 12, lines 37-49).

As is known in the art, conventional extrusion processes are tailored so as not to degrade the polymers being extruded (See Thomas Declaration, ¶¶ 9-11). In the process disclosed in Walton, the ingredients are dry mixed and added to a hopper of a twin screw extruder. The polymers are dispersively mixed in the melt and conveyed by the twin screw extruder. Upon exit, the materials are immediately chilled (Col. 12, lines 50-59).

Walton does not disclose the presence of a graft copolymer of the high and low performance elastomers. As recited in Applicants' Claims 1, 13, 25 and 31, the graft copolymer is present in the claimed mixture as a third ingredient (in addition to a high performance elastomer and a low performance elastomer).

Furthermore, Walton does not disclose a process which inherently forms a graft copolymer from a mixture of high and low performance elastomers (Thomas Declaration, ¶¶ 9-11). As explained on page 18, line 16 – page 9, line 2 of Applicants' specification, the graft copolymer can be prepared from a mixture using solid state shear pulverization. This requires use of a high torque twin-screw extruder equipped with co-rotating screws fitted with kneading and shearing elements as well as conveying elements. As explained, the particular twin screw extruder is specifically designed to generate high friction and heat in the kneading and shearing portions of the extruder. The kneading and shearing elements cause chain scission ("visbreaking") of polymer molecules of high and low performance elastomer, to generate free radicals and/or breaking of double bonds, which enable segments of high and low performance elastomer to react together to form a single molecule.

In other words, the process employed to form the graft copolymer is not a simple twin-screw conveying extruder. Twin-screw conveying extruders are typically equipped only with conveying elements, and are devoid of kneading and shearing elements. Also, typical conveying twin-screw extruders employ counter-rotating screws to convey the material forward more efficiently. By contrast, co-rotating twin-screw extruders as used by Applicants are more useful as reactors due to their versatility which enables the use of kneading and shearing elements (Thomas Declaration, ¶¶ 5-8).

As explained in Applicants' specification, the inclusion of a graft copolymer compatibilizes the high and low performance elastomers, and provides a solution to a long-standing problem of incompatibility. If the high and low performance elastomers spontaneously formed graft copolymers under normal extrusion conditions (as assumed by the Examiner), then the polymers would self-compatibilize, and the problem being solved by Applicants never would have existed in the first place. The Examiner has provided no evidence, by way of prior art disclosure or otherwise, to establish that high and low performance elastomers form graft copolymers under normal extrusion conditions.

In summary, Walton does not disclose a graft copolymer of high and low performance elastomers, as required by Applicants' claims. The Examiner cited no prior art which discloses such a graft copolymer. No claim is anticipated or rendered obvious, and the rejection should be withdrawn.

b) Conclusion

Applicants believe that the claims as presented, are in condition for allowance. If the Examiner detects any unresolved issues, then Applicants' attorney maintains the earlier request for a telephone interview.

Respectfully submitted,



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